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TECHNOLOGICAL USABILITY AND EFFECTIVENESS OF THE E-LEARNING SYSTEM: EVIDENCE FROM MUNI UNIVERSITY, UGANDA

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Abstract:
This investigation was intended to unveil the Technological usability of the e-learning system in Muni University. The study adopted a Case Study Design to allow in-depth study. Quantitative and Qualitative approaches were employed. A total of 218 questionnaires were administered to the respondents and 179 questionnaires were received back registering a response rate of 82%. Descriptive statistics were computed. Inferential statistical analysis included correlation and multiple regressions, which were used to test the hypotheses. The correlation coefficient (r) was used to determine the strength of the relationship. The significance of the coefficient (p) was used to test the relationship between the independent and the dependent variables. Regressions and ANOVA determined which of the independent variables accounted most for the variance in the dependent variable. Qualitative data were analyzed under themes. Results show that technological usability has very high influence on the effectiveness of the e-learning system at Muni University accounting for 82% variance in the effectiveness.

Keywords: technological usability, effectiveness and e-learning

1. Introduction

This study was intended to examine the effectiveness of the Technological usability of the e-learning system in Muni University. "Technological usability" indicators indices included Hardware, Software and Connectivity. Effectiveness was considered in terms

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of Uploading Assignments, Quiz, Lecture notes, Chats, Forum, Choices, Workshops and Reading materials. Effectiveness of e-learning in Universities has become an issue of concern, despite the continuous government support for e-learning programs. The study was therefore intended to establish why, despite the government efforts on improvement of e-learning technologies, the effectiveness of the e-learning system in Muni University remained wanting. The study presents the background to the study, the problem statement and the objectives; it continues to presents the methodology used to carry out the study, results, conclusion and recommendation.

2. Background to the study

The term 'e-learning' has only been in existence since 1999. When the word was first utilized, other terms - such as 'online learning' and 'virtual learning' - also began to spring up in search of an accurate description of exactly what e-learning was. However, the principles behind e-learning have been well documented throughout history, and there is even evidence that suggests that early forms of e-learning existed as far back as the 19th century (Squires and Preece, 1999).

Melis, Weber and Andres (2003) argue that with the introduction of the computer and internet in the late 20th century, e-learning tools and delivery methods expanded. The first MAC in the 1980s enabled individuals to have computers in their homes, making it easier for them to learn about particular subjects and develop certain skill-sets. Then, in the following decade, virtual learning environments began to truly thrive, with people gaining access to a wealth of online information and e-learning opportunities.

By the early 90s, several schools had been set up to deliver courses online, making the most of the internet and bringing education to people unable to attend a college due to geographical or time constraints. Technological advancements also helped educational establishments reduce the costs of distance learning - a saving that could then be passed on to the students, helping bring education to a wider audience (Lohr, 2000).

At the end of the 90s, the learning management systems (LMS) spread widely. Some universities preferred to design and develop their own systems, but most of the educational institutions started with systems from the market. The dawn of the learning management systems (LMS) allowed students and teachers to exchange learning materials, do tests, communicate with each other in many ways, track and trace their progress. The environment was able to facilitate learning in quite an easy way: the product was simple to use, and for teachers it didn't represent a steep learning curve.

In the 2000s, businesses began using e-learning to train their employees. New and experienced workers alike now had the opportunity to improve upon their industry knowledge base and expand their skill-sets. At home, individuals were granted access to programs that offered them the ability to earn online degrees and enrich their lives through expanded knowledge. The future holds a new wave of e-learning inspired by social media, Massive Open Online Courses (MOOCs), Selective Open Online Courses (SOOCs) and even websites like YouTube. Individuals and companies alike are taking the opportunity to use these different outlets to share information and learn from each other. Filtered sits on this wave, and has the cutting-edge technology to help any individual grow their knowledge base.

However, the role of the technology here is primarily to get remote learners into a position to learn as favourably as though they were campus-based, rather than offering a new teaching method. In such a case the enhancement should be seen as pragmatic rather than pedagogic, achieving cost effective access to learning, rather than a new way to achieve deep understanding of a concept. Even something that looks like a new paradigm for achieving learning outcomes, a peer-to-peer learner-matching tool, for example, may represent only an incremental advance in pedagogic terms, though its educational value may be enormous if it could be exploited through an educational infrastructure which integrated its use with quality assurance methods. It is important, therefore, not to take too narrow a view of what constitutes e-learning, or of where its main value might lie.

3. Statement of the problem

In a bid to improve equitable access to university education, the government of Uganda has over the past years spent resources in Muni University with the aim that the resources will improve community outreach, research, teaching and learning in the university.

Muni University has received and used part of these resources to adopt e-learning technologies as means for delivering course content. However despite the adoption of the e-learning system, there are considerable challenges facing the usability and effectiveness of the systems that have caused considerable concerns but no empirical study has been conducted to provide scientific evidence on the matter under consideration thus the need for this study to fill the gap.

4. Methodology

This section explains how data for the study was collected and analyzed. It states the study design, the location and study population. It also presents the sample size and selection of the sampling technique and procedure, as well as data collection instruments and methods. The section further presents methods of data analysis and measurements.

The study adopted a Case Study Design to allow in-depth study. Quantitative and Qualitative approaches were employed for collecting and analyzing data. Primary data was obtained through questionnaires and interviews, while Secondary data was obtained through analysis of available documents and journals. Through these methods, the researcher was able to obtain adequate data for better analysis and attain methodological triangulation.

The study was conducted in Muni University, which is located in Arua District, 3Km South of Arua town in North-Western Uganda. Muni University is a Public university established by the Uganda Government by Statutory Instrument, 2013 No. 31, in accordance with the Universities & Other Tertiary Institutions Act 2006 as amended. For the purpose of this study, the sampled population was purposively selected comprising of traditional staff, Head Teachers and Local Council V and III Executive Members. Staff who must have worked in the District for a minimum of one year for the case of technical staff and only Executive Committee Members of Sub-counties for the case of Local Council III Councilors and all the District Councilors were selected.

A sample size of 82 respondents was determined using statistical tables of Krejcie & Morgan as cited by Amin (2005). The sample included various categories as specified in Table 1 below:

Table 1: Research respondents by category and sample

No.	Category of respondents	(N)	(S)	Sampling technique
1	Academic staff	26	14	Simple random sampling
2	Administrative staff	77	62	Stratified sampling
3	University Council	15	6	Purposive sampling
5	**Total**	**142**	**82**	

Key: ***N*** – Population Size, ***S*** – Recommended Sample Population *(Krejcie & Morgan, 1970).*

The sample sizes in the Table 1 above are derived from Krejcie & Morgan (1970) table given in Appendix.

5. Sampling Techniques and Procedure

Purposive sampling was used to select University Council members who were interviewed. The researcher chose this technique to select this category of respondents in order to focus on those that are the most knowledgeable and with vast experience about what to be investigated. Simple random sampling was used to select Academic staff and the students expected to participate in the research. The researcher chose this sampling technique for this particular group because this group of respondents is homogenous with almost equal understanding of the topic under investigation. In addition, they constitute a reasonable number to support selection by this procedure. Stratified sampling was used to select staff because it enabled the researcher to determine desired levels of sampling of representation for each group, and provide efficiency.

To ensure validity, the instruments were subjected to the scrutiny of technical persons. Sampling also ensured that the right respondents for the study were selected to ensure that valid data were solicited. To ensure reliability of the instruments, the researchers, conducted a Test-retest reliability of the instruments. The validity of the instruments was 0.907 for the civil servants' questionnaire and 0.787 for the Local Councilors' questionnaire.

Quantitative analysis focused on data obtained from the questionnaires, which was coded and entered into computer using Statistical Package for Social Scientists (SPSS 12.0 for windows) software. Descriptive statistics in form of frequencies and percentages were computed to summarize the information of the respondents and to describe the distribution of respondents on the variables of the study (Amin, 2005). Inferential statistical analysis included correlation and multiple regressions, which were used to test the hypotheses. The correlation coefficient (r) was used to determine the strength of the relationship between the independent variables (IV) and the dependent variable (DV). The sign of the coefficient (positive or negative sign) was used to determine the change in the relationship between the IV and the DV.

The significance of the coefficient (p) was used to test the relationship between the independent variables and the dependent variable by comparing it to the critical significance level at 0.05. The regression coefficient (R) was used to determine the linearity of the relationship (Amin, 2005). In order to determine how much the IV contributed on the DV, the regression coefficient was squared to obtain "R Squared".

Given that points of plotting on a scatter diagram do not usually fall on the linear line, an adjusted R Squared was used. The coefficients of the regression (beta, t-value, and significance) were used to test the significance of the contribution of the independent variables on the dependent variable (Sekaran, 2003; Amin, 2005). ANOVA was used to determine which of the independent variables accounted most of the variance in the dependent variable and vice versa.

Qualitative data analysis in this study involved 'cleaning up' data from the interview guide, categorizing it into themes and patterns, and then making a content analysis to determine the adequacy of the information, credibility, usefulness, and consistency (Woodruffe, 1998).

6. Results of the study findings

Muni University has procured several technological equipment to facilitate e-learning. Technological usability was operationalised into hardware, software and connectivity. A linear regression model was also run to determine the significance of Technological usability and effectiveness of e-learning system and also to prove the first research question which states that e-learning system in Muni University is usable.

Table 4.4.1: Response for hardware usability, software usability and connectivity

Technological usability	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Hardware	42 (41%)	41 (40%)	5 (5%)	15 (14%)	0 (0%)
Software	38 (37%)	37 (36%)	7 (7%)	18 (17%)	3 (3%)
Connectivity	38 (37%)	42 (42%)	6 (6%)	12 (11%)	4 (4%)

Source: Survey result, 2016

Table 4.4.1 above shows that 42 (41%) of the respondents strongly agreed followed by 41 (40%) who agreed that the hardware is easily usable, five percent (5%) neutral while 15 (14%) disagreed on the same point. No respondent had a strong disagreement in this case. Cumulatively, respondents who are in agreement comprise the majority, that is, 83 (81%) implying that at Muni University hardware technology are appropriate.

Table 4.4.1 also shows that 38 (37%) of the respondents strongly agreed that on the software technology were relevant to the work the respondents were doing, 37 (36%) agreed, 7 were neutral while 18 (17%) of the respondents disagreed and 3 strongly disagreed. This implies that software technology is relevant to the work done at Muni University as indicated by the overall cumulative percentage, 73 % (75) of the respondents who were in agreement.

Table 4.4.1 further shows that 38 (37%) of the respondents strongly agreed that there was appropriate connectivity, 43 (42%) agreed and 6 (6%) were undecided, 12 (11%) disagreed and 4 (4%) strongly disagreed. This finding indicates that connectivity was meaningful as supported by a cumulative total of 81 (79%) of the respondent who are in agreement. In line with these findings, it was established from the interview responses that connectivity made it easy to upload, and download resources on the e-learning system.

Linear logistic regression model was conducted to test the first hypothesis, H1 which states thus: Technological usability has a significant effect on e-learning system. Results are shown in the table below:

Table 4.4.2: Linear regression result of Technological usability and effectiveness of e-learning system

coefficients[a]

Model	**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Sig.**
	B	**Std. error**	**Beta**		
1 (Constant) Technological usability	1.689 .624	.215 .053	 .762	7.873 11.842	.000 .000
Model	R	R Square	Adjusted R Square	Std. error of estimate	
1	.762[a]	.581	.577	.41575	

a. Predictor: (Constant), Technological usability, a. Dependent variable: Effectiveness

Source: Survey results, 2016

Table 4.4.2 shows that technological usability has a positive significant effect on e-learning system (β = .000 < 0.005). Technological usability further explains a 57.7% variation on the effectiveness of e-learning system (Adjusted R Square = 0.577). The first hypothesis, H1 which states that Technological usability has a significant effect on e-learning system in Muni University has been proved. Therefore, the null hypothesis has been rejected. The more the technological usability, the higher the effectiveness of the e-learning system.

7. Summary of findings

The finding established in the survey about technological usability and effectiveness of the e-learning system in Muni University are summarized according to the objective the study. Linear regression results for technological usability against effectiveness of e-learning system established that Technological usability has a positive significant effect

on the effectiveness of e-learning system ($\beta < 0.05$) and further explained a 57.7 variation on effectiveness of e-learning system is attributed to Technological usability. Finding further established that hardware technology is appropriate with 83 (81%) respondents in agreement, software available are relevant to the work with 75 (73%) in agreement, connectivity are of good quality with 85 (82%) in agreement.

8. Discussions of the findings

This subsection looks at the discussion of the results for the study of technological usability and effectiveness of the e-learning system at Muni University. Regression results showed that Technological usability has a positive significant effect on e-learning system ($\beta < 0.05$) and further explains a 57.7% variation on e-learning system. The purpose of the Technological usability is to provide relevant equipment that is directly related to e-learning system. According to Alipour (2009), technology is a substantial organization investment in getting a satisfactory return on investment thereby linking technological usability and activities to the company's overall business activities. Thus, complete technological usability enhances the uploading and downloading of e-materials, chats, quiz, forum, and online assignment thus improving the effectiveness of the e-learning system. Several studies have proved that technological usability has a significant effect on e-learning system (Khan, 2011, Sabir et al 2014, Odinga 2010) and thus agree with the fact that the first hypothesis is proven, H1 which states that technological usability has a significant positive effect on e-learning system in Muni University.

The finding of the study also indicated that 82 (81%) of the respondents agree that hardware availed is of good quality. The first step in building a meaningful e-learning system is identifying the relevant hardware. Organizations use a variety of methods for identifying the relevant hardware including key informant survey that provide further details and insight into needs and overall technological usability and material focus. When suitable hardware is provided to the needs, demand and supply are balanced, and e-learning system thus becomes effective. An e-learning expert should have not only skills necessary but also capacity for hardware management, analysis and design and identifying system gaps.

The finding of the study also indicated that 38 (37%) of the respondents strongly agreed that software available were relevant to the work of the respondents, 37 (36%) of the respondents agreed. This is complimented by finding from the interviews where a large number of the respondents noted that software availability had increased their knowledge and skills for better performance and instilled confidence in them making it

easy to execute tasks with increased efficiency and effectiveness. They also argue that it is the source of motivation for those using the e-learning system.

The finding of the study showed that the majority 51 (49%) of the respondents strongly agreed that the quality of the e-learning resources is good and 34 (33%) of the respondents agreed. These findings are also in agreement with interview results where respondents recognized that there are several quality assurance procedures in place to ensure that all the e-learning system are of high quality.

The finding of the study showed that the majority 53 (52%) of the respondents agreed that the technological connectivity implemented is appropriate and 25 (24%) of the respondents strongly agreed. However, findings from interview results heavily criticized the connectivity having revealed that most of the connectivity was slow and unreliable. Despite this, they were in agreement that proper connectivity contributes to e-learning effectiveness. This is supported by Amin et.al (2013) who proved that good connectivity has a positive and strong correlation with system effectiveness at 0.01 significant level while conducting a study on the effectiveness of e-learning system in public universities in Kenya.

9. Conclusion

Conclusions were drawn based on the findings of the study and are hereby presented according to each objective of the study. From the finding of the study, it can be concluded that when hardware, software and internet connectivity are regular and relevant, timely and of high quality, it makes e-learning system effective thus contributing significantly towards the effectiveness of the system as explained by connectivity contributing to a variation of 57.7% in the overall effectiveness of the system. This is due to the fact that connectivity provides links to other resources directly related to effectiveness of the system.

10. Recommendation

Recommendations for this study are drawn from the findings and are based on the conclusions. Issues of deficiency in connectivity came out in the study findings. Accordingly, it is recommended that Muni University should provide technological equipment of high quality and consider incorporating the quality connectivity to enhance the usability and effectiveness of the e-learning system. If the basics of usable connectivity are ignored all users can be disabled by the inappropriate use of e-learning technology. It is worth noting that e-learning ttechnology should be an enabler not a

barrier and that campaigning for usability should simplify life for everyone, not just those with specific accessibility requirements.

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